

5. The project is being implemented in a manner that will minimize damage to areas that could support the valley elderberry longhorn beetle.

9.8.8 Valley Elderberry Longhorn Beetle Literature Cited

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9.9 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

9.9.1 Status of the Species

The vernal pool tadpole shrimp was listed as endangered and vernal pool fairy shrimp was listed as threatened throughout their respective ranges on September 19, 1994 (59 FR 48136).

The status of the vernal pool fairy shrimp and the vernal pool tadpole shrimp have been assessed in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Service 2005) (Recovery Plan) and 5-year reviews. For the most recent comprehensive assessment of the range-wide status of the vernal pool fairy shrimp, refer to the *Vernal Pool Fairy Shrimp (Branchinecta lynchi) 5-Year Review: Summary and Evaluation* (Service 2007a). For the most recent comprehensive assessment of the range-wide status of the vernal pool tadpole shrimp, refer to the *Vernal Pool Tadpole Shrimp (Lepidurus packardii) 5-Year Review: Summary and Evaluation* (Service 2007b). The Service is currently in the process of finalizing its most recent 5-year reviews for both the vernal pool fairy shrimp and the vernal pool tadpole shrimp.

No change in either species' listing status was recommended in the 5-year reviews. Threats such as the loss of vernal pool habitat primarily due to widespread urbanization were evaluated during the reviews and discussed in the final documents. These threats have continued to act on the vernal pool fairy shrimp and vernal pool tadpole shrimp since the 2007 5-year reviews were finalized. The construction of infrastructure associated with urbanization also has contributed greatly to the loss and fragmentation of the vernal pool species including the construction of roads and pipelines. Habitat loss continues to exacerbate the highly fragmented distribution of the vernal pool fairy shrimp and the vernal pool tadpole shrimp. Direct losses of habitat generally represent an irreversible damage to vernal pools. The alteration and loss of habitat surrounding vernal pool complexes may disrupt the physical processes conducive to functional vernal pool ecosystems. Vernal pool hydrology may be altered by further changes to the patterns of surface and subsurface flows due to the changes in the runoff associated with infrastructure.

9.9.2 Environmental Baseline

Vernal Pool Fairy Shrimp

Vernal pools and seasonal wetlands within the action area are likely to provide habitat for vernal pool fairy shrimp and all suitable habitat is presumed occupied. No surveys have been conducted for the species within the action area, but known occurrences exist.

The PA is within the Altamont Hills core area in the Recovery Plan's Livermore Vernal Pool Region (Service 2005). The Altamont core area is a Zone 1 core area, for which the recovery plan calls for 85 percent of all known occurrences of the vernal pool fairy shrimp to be preserved.

The vernal pool fairy shrimp has been reported from several locations in the action area (Service 2005, 2007a). In the PA, vernal pools that may support the vernal pool fairy shrimp occur in Jepson Prairie, in the CDFW Tule Ranch Unit of the Yolo Bypass, in the Stone Lakes area, near the town of Byron, and along the eastern and northern boundary of Conservation Zone 11. Other potential vernal pool habitat occurs along the eastern boundary of the PA near Stone Lakes. Seven occurrences of the vernal pool fairy shrimp were observed in the south Stone Lakes area and occurrences were found in three locations in the CCF during 2009 surveys conducted by the DWR. A comprehensive survey of vernal pools or habitat for vernal pool fairy shrimp has not been conducted in the action area.

Vernal Pool Tadpole Shrimp

The PA is within the Altamont Hills core area, within the Livermore vernal pool region (Service 2005). The Altamont Hills core area is a Zone 1 core area, the recovery plan calls for 80% of all known occurrences of the vernal pool tadpole shrimp to be preserved range-wide.

Vernal pools and seasonal wetlands within the action area are likely to provide habitat for vernal pool tadpole shrimp and all suitable habitat is presumed occupied. No surveys have been conducted for the species within the action area, but known occurrences exist. Within the PA, vernal pool habitat that may support the vernal pool tadpole shrimp occurs in Jepson Prairie, in the CDFW Tule Ranch Unit of the Yolo Bypass, in the Stone Lakes area, and near the town of Byron. Six occurrences were observed in the Stone Lakes area during 2009 surveys conducted by the DWR. A comprehensive survey of vernal pools or habitat for the vernal pool tadpole shrimp has not been conducted in the action area.

9.9.3 Effects of the Proposed Action

Direct effects are the effects of the PA that directly affect the species. For example, those actions that immediately destroy or adversely affect habitat or displace animals and plants. Individual vernal pool fairy shrimp and vernal pool tadpole shrimp, and their cysts may be injured or killed by actions leading to the loss of habitat (*i.e.*, filling or inundating vernal pools) in which they live. The Service maintains that the partial filling of a vernal pool directly affects the whole vernal pool.

Indirect effects that are caused by or result from a proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Vernal pool habitat indirectly affected includes all habitat supported by impacted upland areas and swales, and all habitat otherwise affected by changes to the watershed, human intrusion, introduced species, and disturbance that will be caused by a proposed action.

According to the CWF BA, implementation of the PA will directly affect 6 and indirectly affect 0.2 acres of modeled vernal pool habitat (Table 9.9.3-1) that is assumed to be occupied by vernal pool fairy shrimp and vernal pool tadpole shrimp. Affected habitats include vernal pools and seasonal wetlands within the action area.

6.2 acres of modeled vernal pool habitat will be permanently impacted due to the proposed expansion of the CCF and related construction activities. Changes in hydrology or the degradation of water quality within vernal pools and seasonal wetlands that are not directly affected by the PA may result in indirect effects to vernal pool fairy shrimp and vernal pool tadpole shrimp habitat and may not currently be fully known or described by the CWF BA.

Table 9.9.3-1. Modeled vernal pool habitat affected by the PA.

Total modeled Habitat in Action Area	Type of Effect	Permanent Habitat Affected		
		Clifton Court Forebay Modifications	Restoration	Total Habitat Affected
89 acres	Direct	6 acres	0	6 acres
	Indirect	0	0.2 acre	0.2 acre

Reclamation has proposed habitat preservation, creation, and enhancement that will minimize the effects of habitat loss on vernal pool fairy shrimp and vernal pool tadpole shrimp habitat prior to impact (Table 9.9.3-2). This land will be protected and managed for the conservation of the species in perpetuity. The protected lands will provide habitat for breeding, feeding and sheltering commensurate with or better than habitat lost as a result of the PA. These lands will help maintain the geographic distribution of the species and will contribute to the recovery of the species by increasing the amount of habitat that is secure from development threats and the other factors that threaten the species that can be addressed by habitat protection and management.

Table 9.9.3-2. Affected modeled vernal pool habitat and proposed compensation.

Proposed Compensation	Direct Effect	Indirect Effect	Habitat Compensation Ratio		Total Habitat Compensation	
			Conservation Bank ¹	Non-bank Site ²	Conservation Bank ¹	Non-bank Site ²
Preservation (direct and indirect effects)	6 acres	0.2 acre	2:1	3:1	12.4 acres	18.6 acres
Restoration/Creation (direct effects only)	6 acres	N/A	1:1	2:1	6 acres	12 acres

¹ Compensation ratios for credits dedicated in Service-approved conservation banks

² Compensation ratios for acres of habitat outside of mitigation banks

9.9.4 Effects to Recovery

The PA would not increase the threats currently impacting the vernal pool fairy shrimp and vernal pool tadpole shrimp as described in the status of species, or preclude implementation of recovery actions. The PA is expected to result in direct and indirect effects to a total of 6.2 acres of vernal pool habitat. DWR has proposed to offset the adverse effects of the loss of individuals and habitat through preservation and creation of up to 30.6 acres of habitat. Habitat loss and degradation are contributing factors to the decline of these species. Protecting and managing

habitat in-perpetuity will minimize the effects of the loss of individuals as a result of the PA and may benefit the recovery of vernal pool fairy shrimp and vernal pool tadpole shrimp.

9.9.5 Reinitiation Triggers

Some project elements and their effects on vernal pool fairy shrimp and vernal pool tadpole shrimp may change as DWR continues to develop the PA and therefore may require reinitiation if project elements are located in areas that occur in or near modeled habitat and effects rise above those analyzed herein.

9.9.6 Cumulative Effects

The activities described in Section 9.2.5 for delta smelt are also likely to affect vernal pool fairy shrimp and vernal pool tadpole shrimp. These include agricultural practices, recreation, urbanization and industrialism, and greenhouse gas emissions. Therefore, the effects described in Section 9.2.5. are incorporated by reference into this analysis for the vernal pool fairy shrimp and vernal pool tadpole shrimp.

9.9.7 Conclusion

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the reproduction, numbers, and distribution of the species. We also consider the effects of the action on the recovery of the species. In that context, the following paragraphs summarize the effects of the PA on the vernal pool fairy shrimp and vernal pool tadpole shrimp.

Reproduction

The aquatic habitat used for reproduction in the action area represents a small proportion of the total aquatic habitat range-wide. The compensatory mitigation measures are anticipated to minimize the effects of loss of reproduction resulting from loss and fragmentation of habitat. Therefore, the PA will not appreciably affect vernal pool fairy shrimp and vernal pool tadpole shrimp reproduction range-wide, and we conclude that the effects would not reduce the range-wide reproductive capacity of these species.

Numbers

The aquatic and upland habitat within the action area represents a small proportion of the total amount of habitat range-wide. Also, Reclamation and DWR have proposed measures to avoid and minimize the effects of the PA on these species. Despite the proposed conservation measures, we anticipate the PA is likely to adversely affect these two species; however, the number of individuals affected will be very low relative to the range-wide numbers. Therefore, the PA will not appreciably reduce the number of vernal pool fairy shrimp and vernal pool tadpole shrimp.

Distribution

The vernal pool fairy shrimp have fairly large and dispersed distribution. We do not anticipate that the range-wide distribution of the vernal pool fairy shrimp or vernal pool tadpole shrimp will be reduced because it will not eliminate or significantly reduce the distribution of the species from any recovery core area or county. The effect to the species from habitat loss and fragmentation will be minimized by the proposed compensatory mitigation measures. Therefore, we do not expect Reclamation's actions will reduce the species' distribution relative to its range-wide condition.

Effects on Recovery

Reclamation and DWR are proposing to minimize the adverse effects of the loss of suitable habitat by implementing actions to promote the recovery of the affected species in a manner where the mitigation is commensurate with the adverse effect. Reclamation and DWR have proposed to restore or protect suitable habitat to offset the total loss of suitable habitat. Habitat loss and degradation are contributing factors to the decline of these two species; consequently, restoration or protection of additional suitable habitat is a reasonable means of offsetting the adverse effects and may benefit the recovery of this species. Therefore, we conclude that the PA would not appreciably reduce the likelihood of recovery of the vernal pool fairy shrimp or vernal pool tadpole shrimp.

Conclusion

After reviewing the current status of the vernal pool fairy shrimp and vernal pool tadpole shrimp, the environmental baseline for the action area, the effects of the PA, and the cumulative effects, it is the Service's biological opinion that the PA is not likely to jeopardize the continued existence of the vernal pool fairy shrimp and vernal pool tadpole shrimp. We have reached this conclusion because:

1. The number of individuals likely to be affected by project activities will be relatively low.
2. The low number of individuals likely to be affected by the project will not appreciably reduce the likelihood of survival and recovery of the species range-wide because many more individuals and larger habitat areas outside of the action area will remain.
3. Reclamation and DWR have proposed numerous and comprehensive measures to avoid and minimize potential effects, including compensatory mitigation measures.
4. Reclamation and DWR propose to restore or protect habitat that could support the species.
5. The project is being implemented in a manner that will minimize or avoid some effects to both species.

9.9.8 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Literature Cited

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- (Service) U.S. Fish and Wildlife Service. 2007b. Vernal Pool Tadpole Shrimp (*Lepidurus packardii*) 5-Year Review: Summary and Evaluation. Sacramento, California.

9.10 Western Yellow-Billed Cuckoo

9.10.1 Status of the Species

The Service listed the western distinct population segment of the yellow-billed cuckoo (western yellow-billed cuckoo) as endangered in 2014 (79 FR 59992). The information in this section is from the final rule, the proposed rule and the CWF BA.

The number of western yellow-billed cuckoos in the western United States has declined substantially over the past 100 years, coincident with the widespread loss and degradation of riverine riparian woodlands. Ongoing threats to the yellow-billed cuckoo include habitat loss from flood control projects and maintenance, alterations to hydrology, development of urban and agricultural areas, climate change, and invasive species.

A recovery plan has not yet been developed for this species. In the absence of a recovery plan, we default to the general conservation needs of the species. For a species like the western yellow-billed cuckoo that has lost much of its former known occupied habitat, recovery would necessitate the conservation of much of the remaining habitat that supports the species. In addition, restoration of suitable habitat that has been disturbed, but otherwise remains undeveloped, would be a priority. Lastly, efforts to establish the species in unoccupied, but otherwise suitable habitat, would contribute to its recovery.

Reproduction and Habitat Requirements

The western yellow-billed cuckoo is a riparian obligate species. Yellow-billed cuckoos use riparian habitat for foraging and nesting. Its primary habitat association is willow-cottonwood riparian forest, but other tree species such as white alder (*Alnus rhombifolia*) and box elder (*Acer negundo*) may be an important habitat element in some areas, including occupied sites along the

Sacramento River (Laymon 1998). Nests are primarily in willow (*Salix* spp.) trees; however, other tree species are occasionally used, including Fremont cottonwood (*Populus fremontii*) and alder. Along the Sacramento River, orchards of English walnut (*Juglans regia*), prune, and almond trees have also been reportedly used for nesting (Laymon 1980). Occupied habitat in Butte County was described by Halterman (1991) as great valley cottonwood riparian forest and great valley mixed riparian forest, including willows, box elder, and white alder. Potential habitat also occurs in valley marshland with willow riparian corridors, such as that found in the Llano Seco area of Butte County.

Western yellow-billed cuckoos may be found in a variety of vegetation types during migration, including coastal scrub, secondary growth woodland, hedgerows, humid lowland forests, and forest edges from sea level to 8,125 ft in elevation (Hughes 1999). Additionally, during migration they may be found in smaller riparian patches than those in which they typically nest. This variety of vegetation types suggests that the habitat needs of the western yellow-billed cuckoo during migration are not as restricted as their habitat needs when nesting and tending young.

On the Santa Ana River, nest site height in willow trees averaged 14 ft, but on the Sacramento River, a nest in a cottonwood tree was reported at 100 ft and canopy cover is typically dense (averaging 96.8% at the nest). Patch size was found to be the most important habitat variable to predict presence of western yellow-billed cuckoos on the Sacramento River (Girvetz and Greco 2009). Large patch sizes (20 to 40 hectares, with a minimum width of 100 meters) are typically required for cuckoo occupancy (Laymon 1998; Riparian Habitat Joint Venture 2004).

Although western yellow-billed cuckoo's nest primarily in willow trees, Fremont cottonwood trees are important foraging habitat, particularly as a source of insect prey. All studies indicate a highly significant association with relatively expansive stands of mature cottonwood-willow forests; however, western yellow-billed cuckoos will occasionally occupy a variety of marginal habitats, particularly at the edges of their range (Laymon 1998). Continuing habitat succession has also been identified as important in sustaining breeding populations (Laymon 1998). Meandering streams that allow for constant erosional and depositional processes create habitat for new rapidly growing young stands of willow, which create preferred nesting habitat conditions for western yellow-billed cuckoo. Lateral channel migration and point bar deposition that create new floodplains and channel bend cut-offs that create floodplain lakes are important processes that create viable western yellow-billed cuckoo habitat (Greco 2013).

A habitat model developed by Gaines (1974) for the yellow-billed cuckoo in the Sacramento Valley includes the following elements: patch size of at least 25 acres, at least 330 ft wide and 990 ft long, within 330 ft of surface water, and dominated by cottonwood/willow gallery forest with a high-humidity microclimate. Laymon and Halterman (1989) further refined the model by classifying habitat patch sizes for suitability. A willow-cottonwood forest patch greater than 1,980 ft wide and greater than 200 acres (81 hectares) is classified as optimum habitat; a patch 660 to 1,980 ft wide and 102.5 to 200 acres (41.5 to 81 hectares) is suitable; a patch 330 to 660 ft wide and 50 to 100 acres (20 to 40 hectares) is marginal, and smaller patches are unsuitable. The

Riparian Habitat Joint Venture recommends restoring habitat in 25 locations to support 625 pairs (25 pairs per location) (Riparian Habitat Joint Venture 2004). Predictions suggest that a minimum of at least 25 pairs in a subpopulation, with interchange with other subpopulations, should be relatively safe from extirpation (Riparian Habitat Joint Venture 2004). To achieve this goal for the Sacramento Valley, it would be necessary to establish or preserve at least 6,070 hectares (15,000 acres) of optimum and suitable habitat. As of 1998, only 2,367 hectares (5,850 acres) of habitat were considered suitable (Laymon 1998).

Limited information is available on home range and territory size. Territory size at the South Fork Kern River ranged from 20 to 100 acres (8 to 40 hectares) (Laymon 1998), and on the Colorado River as small as 10 acres (4 hectares) (Laymon and Halterman 1989). Patch size, type and quality of habitat, and prey abundance largely determine the size of territories (Halterman 1991). Laymon and Halterman (1989) concluded that sites greater than 200 acres in extent and wider than 1,950 ft were optimal and sites 101 to 200 acres in extent and wider than 650 ft were suitable.

Pesticides, whether applied directly onto riparian habitat or sprayed on adjacent agricultural areas, may affect the reproductive success of the western yellow-billed cuckoo. This species preys on katydids, caterpillars, cicadas, and other large insects. A reduction in the availability of suitably sized prey may lead to the abandonment of nesting areas.

Numbers

The proposed listing rule states that population of the western yellow-billed cuckoo “has declined by several orders of magnitude over the past 100 years” and that this decline is continuing. Surveys over the past 15 years (since the Service placed the western yellow-billed cuckoo on the candidate list [66 FR 38611]) have documented losses of breeding pairs in smaller isolated sites and at core breeding areas. The Service estimated the current breeding population at 680 to 1,025 pairs, with 350 to 495 pairs north of the Mexican border and the remainder in Mexico. Because western yellow-billed cuckoos move between nesting areas during the breeding season and may have been counted twice during surveys, these numbers may overestimate the number of breeding pairs.

Distribution

The western yellow-billed cuckoo formerly bred in California, Arizona, New Mexico, Oregon, Washington, western Colorado, western Wyoming, Idaho, Nevada, Utah, and probably southern British Columbia, Canada. The species’ current breeding range reaches its northwestern limit in the Sacramento Valley, California (although a small, potentially breeding population exists in coastal northern California on the Eel River). The northeastern portion of the breeding range is in southeastern Idaho. They breed at several sites in California, Nevada, Arizona, and New Mexico. Yellow-billed cuckoos winter in South America from Venezuela to Argentina (Hughes 1999; Sechrist *et al.* 2012) after a southern migration that extends from August to October (Laymon

1998). They migrate north and arrive at California breeding grounds between May and July, but primarily in June (Gaines and Laymon 1984; Hughes 1999; 78 FR 61621).

Studies conducted in 1986 and 1987 indicate that there were approximately 31 to 42 pairs in California (Laymon and Halterman 1987) at that time. Although a few occurrences have been detected elsewhere recently, including near the Eel River, the only locations in California that currently sustain breeding populations include the Colorado River system in southern California, the South Fork Kern River east of Bakersfield, and isolated sites along the Sacramento River in northern California (Laymon and Halterman 1989; Laymon 1998; Halterman 2001; Hammond 2011; Dettling *et al.* 2014; Stanek 2014; Parametrix Inc. and Southern Sierra Research Station 2015). We do not have extensive information on the winter range of the western yellow-billed cuckoo.

9.10.2 Environmental Baseline

Although there are only two historical records in the vicinity of the action area (CDFW 2013), the species is known to have been historically common in riparian habitat throughout the Central Valley, from Kern County north to Redding (Laymon 1998). Yellow-billed cuckoo detections have occurred most frequently in the upper Sacramento River where levees are setback from the river or do not exist. Additionally, the last 20 years has seen a large amount of riparian restoration occur in the upper Sacramento River. Habitat in the action area tends to be more narrow and linear than in the upper Sacramento River. The American River has a wider floodplain due to levees being setback from the channel. There are some patches large enough to support nesting yellow-billed cuckoos, though cuckoos have not been observed nesting along the American River.

In 2013, there were two unconfirmed audible occurrences along the American River Parkway approximately five miles from the action area. These two occurrences were less than five miles apart along the river and heard on the same day (EBird 2015). In 2015, there was a confirmed visual occurrence along the American River located in proximity to both the 2013 occurrences and approximately five miles from the action area (EBird 2015).

There are no recently confirmed western yellow-billed cuckoo breeding locations in the action area. In summer 2009, DWR detected one and possibly two yellow-billed cuckoos in a remnant patch of riparian forest in the vicinity of Delta Meadows (Delta Habitat Conservation and Conveyance Program 2011). Breeding status was not confirmed. The two historic sightings and the two recent sightings of yellow-billed cuckoo in the vicinity of the action area are presumed to be migrating birds.

Most riparian corridors in the action area do not support sufficiently large riparian patches or the natural, geomorphic processes that provide suitable cuckoo breeding habitat (Greco 2013). The species likely continues to migrate along the Sacramento River and other drainages to northern breeding sites in the Sutter Basin and Butte County. There are several remnant riparian patches in the vicinity of Mandeville and Medford Islands that provide riparian vegetation suitable for cuckoos, but do not provide sufficiently large patch size to support breeding cuckoos. There have

been few reported occurrences of western yellow-billed cuckoo migrating through the action area. However, it is likely that cuckoos use the action area as stop-over habitat for feeding, resting, and sheltering during their migration.

9.10.3 Effects of the Proposed Action

It was not possible to do field surveys of the entire action area for the western yellow-billed cuckoo because many of the properties are in private ownership. Therefore, suitable modeled habitat was used to identify areas of potential effect. The model identified suitable habitat that the western yellow-billed cuckoo could use during migration as a stopover to rest and forage. The permanent loss of suitable riparian and scrub habitat is expected as a result of the PA activities. The loss of suitable habitat could diminish available foraging and sheltering habitat for the western yellow-billed cuckoo. Western yellow-billed cuckoos are not known to or expected to nest in the action area. In addition, the riparian habitat affected by the construction of the PA does not have habitat patches large enough to support nesting western yellow-billed cuckoos.

Disturbance of western yellow-billed cuckoos may cause individuals to move more frequently than they would under natural conditions and result in energy expenditures that could affect the ability of the individual to survive. Workers, equipment, or the placement of ancillary flood control project structures may create enough noise or disturbance to flush western yellow-billed cuckoos temporarily from suitable habitat or cause them to avoid small areas of suitable habitat within or adjacent to the action area or abandon it and to seek out new territories. Noise and human/vehicle presence associated with project activities could flush western yellow-billed cuckoos from suitable habitat exposing them to higher predation risk and increased energy expenditure.

Water Conveyance Facility Construction-Habitat Loss

Activities associated with water conveyance facility construction that could adversely affect western yellow-billed cuckoos in the form of harm and harassment include: the north Delta intakes, tunneled conveyance facilities, reusable tunnel material, power supply and grid connection. These construction activities will destroy or modify habitat that migrating western yellow-billed cuckoos use for feeding, resting, and sheltering. Water conveyance facility construction is estimated to last 12 - 15 years, which is long enough to assume that western yellow-billed cuckoos will avoid using the estimated 32.25 acres of modeled habitat over the long-term, resulting in permanent impacts as a result of water conveyance facility construction. Construction of the north Delta intakes will result in the loss of an estimated 5 acres of western yellow-billed cuckoo habitat. Construction of the Tunneled Conveyance Facilities will result in the loss of an estimated 11.25 acres of western yellow-billed cuckoo habitat. Placement of reusable tunnel material will result in the loss of an estimated 12 acres of western yellow-billed cuckoo habitat. Construction of the transmission lines will result in the loss of an estimated 4 acres of western yellow-billed cuckoo habitat. This habitat loss will be offset through riparian creation or restoration at a 2:1 ratio for a total of 64.5 acres. This creation or restoration will

provide habitat that is not subject to disturbance and will provide migratory cuckoo habitat necessary for feeding, resting, and sheltering.

Water Conveyance Facility Construction - Noise, Lighting, Vibration

In addition to the habitat loss, construction itself has the potential to adversely affect yellow-billed cuckoos. Construction that occurs when the cuckoo is migrating through the action area (using non-breeding habitat as a stopover to rest or forage) has the potential to harass western yellow-billed cuckoos due to noise, vibration, and nighttime lighting effects causing them to move to other locations which could expose individual cuckoos to increased predation and decreased foraging opportunities. When noises or disturbances are repeated over a long period, they could cause physiological stress to migrating western yellow-billed cuckoos.

Intake construction will require the use of loud, heavy equipment within the construction sites as well as along the access roads to the site. Pile driving for the north Delta intakes will create noise and vibration effects. Ongoing maintenance activities at the intakes include intake dewatering, sediment removal, debris removal, and biofouling and corrosion removal and will occur from water-based equipment approximately annually. These activities will have noise and lighting effects.

The tunneled conveyance facilities include tunnel work areas, vent shafts, the pumping plant and shaft location, a new forebay and spillway, tunnel conveyors, barge unloading facilities, fuel stations, and concrete batch plants. Construction noise up to 60 dBA will occur at up to 2,000 ft from the forebay and spillway construction footprint. These activities will have noise and lighting effects.

Power supply and grid connections include construction of temporary power lines to power construction activities and construction of permanent transmission lines to power conveyance facilities. Construction of new transmission lines will require site preparation, tower or pole construction, and line stringing. These activities will have noise and lighting effects. Migrating cuckoos may be subject to bird strikes at the transmission lines.

RTM activities at each site will include the use of heavy equipment for ground clearing and grading and soil tilling and rotation. Material will be moved to the site using a conveyor belt for long-term on-site storage.

Construction activities will create noise up to 60 dBA at no more than 1,200 ft from the edge of the construction footprint unless pile driving is required, in which case noise up to 60 dBA could reach up to 2,000 ft from the edge of the construction footprint. While 60 dBA is the standard noise threshold for birds (Dooling and Popper 2007), this standard is generally applied during the nesting season, when birds are more vulnerable to behavioral modifications that can cause nest failure. There is evidence, however, that migrating birds will avoid noisy areas during migration (McClure *et al.* 2013). To minimize this effect, the noise in the vicinity of western yellow-billed cuckoo habitat will be reduced as described in the CWF BA Appendix 3.F, *General Avoidance*

and Minimization Measures section. This will include surveying for western yellow-billed cuckoo within the 60 dBA noise contour around the construction footprint, and if a yellow-billed cuckoo is found, limiting noise to less than 60 dBA where the bird occurs until it has left the area. Pile driving will be limited to daytime hours within 1,200 ft of western yellow-billed cuckoo habitat.

Night lighting may also have the potential to affect migrating western yellow-billed cuckoos. While there is no data on effects of night lighting on migration for this species, studies show that migrating birds of other species are attracted to artificial lights and this may disrupt their migratory patterns or cause collision-related fatalities (Gauthreaux and Belser 2006). To minimize this effect, all lights will be screened and directed away from western yellow-billed cuckoo habitat as described in *Avoidance and Minimization Measures* Section. There will still be some potential, however, for light-related effects to occur.

It is possible for migrating western yellow-billed cuckoos to be injured or killed by colliding with the transmission lines. All project and existing transmission lines will have bird strike diverters installed in a configuration that research indicates will reduce bird strike risk by at least 60% or more, as described in the CWF BA Appendix 3.F, *General Avoidance and Minimization Measures* section. With this implementation of this measure, western yellow-billed cuckoo collisions with transmission lines are not likely to occur.

The activities listed above are expected to affect the western yellow-billed cuckoo in the form of harm and harassment. Construction activities are estimated to result in the permanent habitat loss of 32.25 acres.

9.10.4 Effects to Recovery

The loss of suitable habitat will affect the western yellow-billed cuckoo. Noise, lighting and vibration also have the potential to temporarily cause adverse effects to the western yellow-billed cuckoo. The compensatory mitigation efforts proposed fit within general conservation efforts that we default to for species that lack a recovery plan. These threats will be minimized by Reclamation's and DWR's proposal to restore or protect suitable habitat for the western yellow-billed cuckoo. The restoration and protection of riparian habitat would provide relatively greater benefit to the western yellow-billed cuckoo because of the importance of this habitat type; however, the small amount of habitat involved (approximately 32 acres) will not appreciably alter conditions conducive for migratory western yellow-billed cuckoos in the action area. Therefore, we conclude that the PA will not have a permanent effect on the recovery of the western yellow-billed cuckoo.

9.10.5 Reinitiation Triggers

Some project elements and their effects on western yellow-billed cuckoo may change as DWR continues to develop the PA and therefore may require reinitiation if project elements are located in areas that occur in or near modeled habitat and effects rise above those analyzed herein.

9.10.6 Cumulative Effects

The activities described in Section 9.2.5 for delta smelt are also likely to affect western yellow-billed cuckoo. These include agricultural practices, recreation, urbanization and industrialism, and greenhouse gas emissions. Therefore, the effects described in Section 9.2.5. are incorporated by reference into this analysis for the western yellow-billed cuckoo.

9.10.7 Conclusion

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the reproduction, numbers, and distribution of the species. We also consider the effects of the action on the recovery of the species. In that context, the following paragraphs summarize the effects of the PA on the western yellow-billed cuckoo.

Reproduction

The western yellow-billed cuckoo is a secretive and hard-to detect bird that is relatively rare in the action area (Hughes 1999; Delta Habitat Conservation and Conveyance Program 2011; CDFW 2013; EBird 2015; Halterman *et al.* 2015; 79 FR 59992). Therefore, the PA will not appreciably affect western yellow-billed cuckoo reproduction, and we conclude that the effects would not reduce the range-wide reproductive capacity of the species.

Numbers

As described in the Reproduction section above, the number of western yellow-billed cuckoos in the action area is relatively low, based on recent and past records (Hughes 1999, Delta Habitat Conservation and Conveyance Program 2011; CDFW2013; EBird 2015; Halterman *et al.* 2015, 79 FR 59992). Also, Reclamation and DWR have proposed measures to avoid and minimize the effects of the PA on the species. Despite the proposed protection measures, we anticipate the PA may still result in effects to the western yellow-billed cuckoo; however, the number of western yellow-billed cuckoos affected would be very low. This is especially true relative to the range-wide numbers. Therefore, the PA will not appreciably reduce the number of western yellow-billed cuckoos throughout the species' range.

Distribution

During migration, western yellow-billed cuckoos may stop to rest and forage in variety of vegetation types where construction of water conveyance facilities could be located; the loss of this stop-over habitat will not have a measurable effect on the species.

The number of western yellow-billed cuckoos likely to be affected by projects activities will be very low. We do not expect that any western yellow-billed cuckoos will be directly killed by construction of the water conveyance facilities, and that very few western yellow-billed cuckoos

will be affected by the PA activities. We also conclude that western yellow-billed cuckoos will continue to survive in the action area regardless of the activities. Consequently, the water conveyance facility construction will not alter the distribution of the western yellow-billed cuckoo and we do not expect Reclamation's actions will reduce the species' distribution relative to its range-wide condition.

Effects on Recovery

As discussed above, we have not yet developed a recovery plan for the western yellow-billed cuckoo. In the absence of a recovery plan, we default to the general conservation of the species. For a species like the western yellow-billed cuckoo that has lost much of its habitat, recovery would necessitate the conservation of much of the remaining habitat that still supports it.

Reclamation and DWR are proposing to minimize the adverse effects from the loss of suitable habitat by implementing actions to promote the recovery of the affected species in a manner where the mitigation is commensurate with the adverse effect. Reclamation and DWR have proposed to restore or protect suitable habitat to offset the total loss of suitable habitat. Habitat loss and degradation are contributing factors to the decline of western yellow-billed cuckoo; consequently, restoration or protection of additional suitable habitat is a reasonable means of offsetting the adverse effects and may benefit the recovery of the western yellow-billed cuckoo. Therefore, we conclude that the PA would not appreciably reduce the likelihood of the recovery of the western yellow-billed cuckoo.

Conclusion

After reviewing the current status of the western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the PA, and the cumulative effects, it is the Service's biological opinion that the construction of the California WaterFix facilities, as proposed, is not likely to jeopardize the continued existence of the species. We have reached this conclusion because:

1. The number of western yellow-billed cuckoos likely to be affected by projects activities will be very low.
2. The low number of individuals likely to be affected by the project will not appreciably reduce the likelihood of western yellow-billed cuckoos survival and recovery because many more individuals and larger habitat areas outside of the action area will remain.
3. Reclamation and DWR have proposed numerous and comprehensive measures to avoid and minimize potential effects.
4. Reclamation and DWR propose to restore or protect habitat that could support the western yellow-billed cuckoo.

5. The project is being implemented in a manner that will minimize damage to areas that could support the western yellow-billed cuckoo.

The PA will not result in the loss of breeding habitat of the western yellow-billed cuckoo.

9.10.8 Western Yellow-billed Cuckoo Literature Cited

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10.0 INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by Reclamation and/or the Corps so that they become binding conditions of any grant or permit issued to DWR, as appropriate, for the exemption in section 7(o)(2) to apply. Reclamation and/or the Corps have a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation and/or the Corps (1) fails to assume and implement the terms and conditions, or (2) fails to require DWR to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Reclamation, the Corps, or DWR must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

The Service has determined that CWF presents a mixed programmatic action, as defined in 50 CFR 402.02. The consultation includes a mix of standard consultation and programmatic consultation. Some of the project elements of the PA are analyzed in this BiOp at a site-specific level for near-term implementation with no future Federal action required. For other project elements, the PA provides a framework for the development of future Federal actions that will be authorized, funded, or carried out at a later time, and this BiOp uses a programmatic approach to evaluate those elements of the PA. Therefore, consistent with our regulations at 50 CFR 402.14(i)(6), this ITS only covers those standard consultation elements of the PA for which incidental take is reasonably certain to occur. The incidental take exemptions provided for in this incidental take statement are effective only upon issuance by Reclamation and the Corps of the proposed federal decisions and approvals for which consultation was requested under section 7.

10.1 Amount or Extent of Take

Due to the implementation of the PA, the Service anticipates the following levels of incidental take. Upon implementation of the Reasonable and Prudent Measures, incidental take associated

with the project will become exempt from the prohibitions described under section 9 of the Act.

Delta Smelt

The Service anticipates incidental take of delta smelt adults, juveniles, larvae, and/or eggs will be difficult to detect and quantify because of the species' small size and cryptic nature and therefore it is not possible to provide precise numbers of delta smelt that could be harmed, injured, or killed from all proposed actions. There are numerical limitations with respect to detecting individual delta smelt in the wild, for that reason, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual delta smelt. Of the proposed standard, project-level actions, effects from geotechnical explorations and construction of barge landings will result in incidental take of delta smelt. Due to the difficulty in quantifying the number of delta smelt that will be taken as a result of the PA, the Service is using shallow water habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the geotechnical explorations and construction-related activities, the Service anticipates that all delta smelt within 22.4 acres of shallow water habitat identified in the CWF BA to be permanently or temporarily affected from in-water work activities associated with the barge landings will be subject to incidental take in the form of harm, injury, or mortality and all delta smelt will be subject to incidental take in the form of harm and harass from 100 in-water boring locations that will disturb foraging and sheltering behavior. The amount of shallow water habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat contains features that individual delta smelt use for breeding, feeding, and sheltering (such as spawning substrate) and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of: the current low relative abundance; the magnitude, scope, and timing; and the proposed conservation measures which include minimization measures such as in-water work window restrictions for delta smelt. The Service will consider the amount or extent of incidental take of delta smelt to be exceeded if shallow water habitat is impacted beyond the 22.4 acres identified.

California Red-Legged Frog

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect due to their cryptic nature and wariness of humans. Losses of this species may also be difficult to quantify due to a lack of project-specific species and habitat survey data, the long-term nature of the project, and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. For these reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual California red-legged frogs. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all California red-legged frogs within the 69.1 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by pre-construction and construction activities will be

subject to incidental take in the form of harm, injury, or mortality. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain features that California red-legged frogs use for breeding, feeding, and sheltering (such as aquatic features and burrows) and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include confining activities to the dry season, limiting light disturbance, and providing escape ramps. The Service will consider the amount or extent of incidental take of California red-legged frog to be exceeded if modeled suitable habitat is impacted beyond the 69.1 acres identified.

California Tiger Salamander

The Service anticipates that incidental take of the Central California tiger salamander will be difficult to detect due to its cryptic and fossorial nature, and predominantly nocturnal behavior. Losses of this species may also be difficult to quantify due to a lack of project-specific species and habitat survey data, the long-term nature of the project, and seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. For these reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual Central California tiger salamanders. Due to the difficulty in quantifying the number of Central California tiger salamanders that will be taken as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all Central California tiger salamanders within the 58 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by the standard consultation elements will be subject to incidental take in the form of harm, injury, or mortality. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain features that California tiger salamanders use for breeding, feeding, and sheltering (such as aquatic features and burrows) and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include confining activities to the dry season, limiting light disturbance, and providing escape ramps. The Service will consider the amount or extent of incidental take of Central California tiger salamander to be exceeded if modeled suitable habitat is impacted beyond the 58 acres identified.

Giant Garter Snake

The Service anticipates that incidental take of the giant garter snake will be difficult to detect due to their cryptic nature and difficulty in finding individuals with the exception of roadways. For these reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual giant garter snakes in areas besides roadways. We expect the incidental take to be in the form of: (1) harm, through the loss of suitable habitat (*i.e.*, cover, food prey), (2) harass, through disturbance during construction or project activities, and (3) injury or mortality through the contact of construction equipment and/or vehicles or increased susceptibility to predation. We expect the loss of suitable habitat is likely to

interfere with normal foraging, sheltering, and reproduction behaviors of all giant garter snake that use the project area. Due to the difficulty in quantifying the number of giant garter snakes that will be taken in the form of harm and harass, or injury and mortality, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all giant garter snakes inhabiting or utilizing the 865 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by the standard consultation elements will be subject to incidental take in the form of harm, harass injury, or mortality. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain features that giant garter snakes use for breeding, feeding, and sheltering (such as small fossorial mammal burrows or natural crevices around man-made features such as concrete culverts) and the anticipated take is caused by such disturbance activities. The Service will consider the amount or extent of giant garter snake to be exceeded if modeled suitable habitat is impacted beyond the 865 acres identified.

Injury or mortality of giant garter snake as a result of contact with construction equipment and/or vehicles on the roadways within the modeled suitable habitat can be quantified and monitored. The Service expects that no more than two (2) giant garter snakes will be killed or injured in a single construction year by contact with construction equipment and/or vehicles. The Service will consider the amount or extent of incidental take of giant garter snake to be exceeded if a total of three (3) or more giant garter snakes are killed or injured in a single construction year.

Least Bell's Vireo

The Service anticipates that incidental take of the least Bell's vireo will be difficult to detect because they are very rarely noted in migration. For this reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual least Bell's vireo. We expect the loss of modeled suitable habitat is likely to result in incidental take in the form of harm of least Bell's vireos that use the project area. Due to the difficulty in quantifying the number of least Bell's vireos that will be taken as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all least Bell's vireo within the 27 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by the standard consultation elements will be subject to incidental take in the form of harm. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain features that least Bell's vireo use for breeding, feeding, and sheltering (such as riparian habitat) and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include pre-construction surveys during the breeding season, and limiting noise and lighting impacts if birds are detected. The Service will consider the amount or extent of incidental take to be exceeded if modeled suitable habitat is impacted beyond the 27 acres identified.

San Joaquin Kit Fox

The Service anticipates that incidental take of the San Joaquin kit fox will be difficult to detect due to their rare sightings in the northern part of their range, nocturnal behavior and propensity to seek refuge within dens if injured, harassed or startled. For these reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual San Joaquin kit foxes. Due to the difficulty in quantifying the number of San Joaquin kit foxes that will be subject to incidental take as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all San Joaquin kit foxes within the 58 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by the standard consultation elements will be subject to incidental take in the form of harm. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain features that San Joaquin kit fox use for feeding and sheltering (such as burrows and foraging habitat containing prey) and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include limiting noise and lighting impacts and avoidance of occupied dens. The Service will consider the amount or extent of incidental take to be exceeded if modeled suitable habitat is impacted beyond the 58 acres identified.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetles are small in size, and their life cycles and patchy habitats make detection difficult and the quantification of impacts to individual valley elderberry longhorn beetles impractical in addition to a lack of project-specific species and habitat survey data. Due to the difficulty in quantifying the number of valley elderberry longhorn beetles that will be subject to incidental take as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all valley elderberry longhorn beetles within the 383.76 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by pre-construction and construction activities will be subject to incidental take in the form of harm, harassment, and mortality. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain elderberry shrubs that valley elderberry longhorn beetle use for breeding, feeding, and sheltering and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include avoiding disturbance to (if possible) or transplanting elderberry shrubs, and avoiding construction activities during the active season (if possible). The Service will consider the amount of extent of incidental take to be exceeded if modeled suitable habitat is impacted beyond the 383.76 acres identified.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

The Service uses habitat as a surrogate to quantify the amount of take when assessing the impacts of actions to both vernal pool fairy shrimp and vernal pool tadpole shrimp. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain the features that vernal pool fairy shrimp and vernal pool tadpole shrimp use for breeding, feeding, and sheltering and the anticipated take is caused by such disturbance activities. Both species of vernal pool crustaceans are small in size, and their complex life cycles and ephemeral habitats make detection difficult and the quantification of impacts to individual vernal pool fairy shrimp and vernal pool tadpole shrimp impractical. Due to the difficulty in quantifying the number of vernal pool fairy shrimp and vernal pool tadpole shrimp that will be taken as a result of the PA, the Service is quantifying incidental take of the fairy shrimp and tadpole shrimp in the form of harm as all fairy and tadpole shrimp within the 6.2 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by pre-construction and construction activities. The Service will consider the amount or extent of incidental take to be exceeded if modeled suitable habitat is impacted beyond the 6.2 acres identified.

Western Yellow-billed Cuckoo

The Service anticipates that incidental take of the western yellow-billed cuckoo will be difficult to detect because they are very rarely noted in migration. For these reasons, it is not practical to express the amount or extent of anticipated take of this species or monitor take-related impacts in terms of individual least Bell's vireo. We expect the loss of modeled suitable habitat is likely to result in incidental take in the form of harm of western yellow-billed cuckoos that use the project area. Due to the difficulty in quantifying the number of western yellow-billed cuckoos and that will be taken as a result of the PA, the Service is using modeled suitable habitat as a surrogate to quantify incidental take of the species. Therefore, to quantify the level of incidental take associated with the PA, the Service anticipates that all western yellow-billed cuckoos within the 27 acres of modeled suitable habitat identified in the CWF BA to be permanently or temporarily affected by the standard consultation elements will be subject to incidental take in the form of harm. The amount of habitat disturbance is an appropriate way to measure the anticipated extent of incidental take because this habitat is likely to contain the riparian habitat that western yellow-billed cuckoos use for breeding, feeding, and sheltering and the anticipated take is caused by such disturbance activities. Injury and mortality are anticipated to be low because of the proposed conservation measures which include pre-construction surveys during the breeding season, and limiting noise and lighting impacts if birds are detected. The Service will consider the amount or extent of incidental take to be exceeded if modeled suitable habitat is impacted beyond the 27 acres identified.

10.2 Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the delta smelt, California red-legged frog, California tiger

salamander, giant garter snake, least Bell's vireo, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western yellow-billed cuckoo.

10.3 Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the California red-legged frog, California tiger salamander, delta smelt, giant garter snake, least Bell's vireo, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western yellow-billed cuckoo:

1. Minimize the effects of construction activities to California red-legged frog, California tiger salamander, delta smelt, giant garter snake, least Bell's vireo, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western yellow-billed cuckoo and their habitat in the action area.
2. Minimize effects to delta smelt through ongoing collaborative efforts focused on the final design and construction procedures for the new and existing infrastructures (*e.g.*, CCF). As appropriate, representatives from DWR, Reclamation, CDFW, NMFS and the Service will participate. These technical teams will convene before construction begins at the facility and will meet periodically until DWR completes final design modifications.

10.4 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation and/or the Corps shall ensure DWR as the applicant shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

The following Terms and Conditions implement Reasonable and Prudent Measure Number 1:

1. Reclamation and/or the Corps shall ensure DWR as the applicant shall ensure that the contractors and operators of the equipment comply with this BiOp, where the contractors and operators involved in the PA will be educated and informed as to the *AMMs* in the CWF BA and *Terms and Conditions* in this BiOp.
2. Reclamation and/or the Corps shall ensure DWR as the applicant develops a Service-approved monitoring plan as identified in the *Description of the Proposed Action* in this BiOp.
3. At least 30 days prior to the onset of any construction-related activities, Reclamation and/or the Corps shall ensure DWR as the applicant submits to the Service, for approval,

the name(s) and credentials of biological monitors it requests to conduct activities specified for this project. Information included in a request for authorization must include, at a minimum: (1) relevant education, (2) relevant training on species identification, survey techniques, handling individuals of different age classes, and handling of different life stages by a permitted biologist or recognized species expert authorized for such activities by the Service, (3) a summary of field experience conducting requested activities (to include project/research information and actual experience with the species), (4) a summary of BiOps and/or informal consultations under which they were authorized to work with the listed species and at what level (such as construction monitoring versus handling), this should also include the names and qualifications of persons under which the work was supervised as well as the amount of work experience on the actual project including detail on whether the species was encountered or not, and (5) a list of Federal Recovery Permits [10(a)1(A)] if any, held or under which individuals are authorized to work with the species (to include permit number, authorized activities, and name of permit holder).

No project activities shall begin until the action agencies have received written Service approval for biologists to conduct specified activities.

4. Reclamation and/or the Corps shall ensure DWR as the applicant complies with all monitoring and reporting requirements as identified in the *Reporting Requirements* in this BiOp.

The following Terms and Conditions implement Reasonable and Prudent Measure Number 2:

1. Reclamation and/or the Corps shall ensure DWR as the applicant minimizes effects to delta smelt through ongoing collaborative efforts related to final design and construction procedures for the new and existing infrastructures.
2. Reclamation and/or the Corps shall ensure DWR as the applicant prepares and provides to the Service draft and final reports summarizing the technical team's efforts.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the PA. If, during the course of the action, this level of incidental take is exceeded, reinitiation of consultation and review of the reasonable and prudent measures provided is required. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

10.5 Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, Reclamation and/or the Corps shall ensure DWR as the applicant shall adhere to the following reporting requirements. Should this

anticipated amount or extent of incidental take be exceeded, Reclamation and/or the Corps must reinitiate formal consultation as per 50 CFR 402.16.

1. The Service must be notified within one working day of the finding of any injured or dead listed species or any unanticipated/unauthorized damage to its habitat or modeled suitable habitat associated with the PA. Notification will be made to the Endangered Species Division Assistant Field Supervisor at the San Francisco Bay-Delta Fish and Wildlife Office at (916) 930-5603, and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent information. When an injured or dead individual of the listed species is found, Reclamation and/or the Corps shall ensure DWR as the applicant shall follow the steps outlined in the Disposition of Individuals Taken section below.
2. Reclamation and/or the Corps shall ensure DWR as the applicant works with the Service, as proposed, to develop monitoring plans to address monitoring of baseline habitat conditions and effects of the facilities after operations commence. Reclamation and/or the Corps shall ensure DWR as the applicant must provide reports to the Service which describes the outcomes of these monitoring efforts.
3. Reclamation and/or the Corps shall ensure DWR as the applicant shall submit monthly construction compliance reports prepared by the action agencies, DWR, or the Service-approved biologist to the San Francisco Bay Fish and Wildlife Office. These reports shall detail: (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting Conservation Measures; (iii) an explanation of failure to meet such measures, if any; (iv) quantified actual ground disturbance with photographs; (v) known project effects on listed species, if any; (vi) occurrences of incidental take of listed species or modeled suitable habitat, if any; (vii) documentation of employee environmental education; and (viii) other pertinent information.

Disposition of Individuals Taken

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact persons are the Assistant Field Supervisor of the Endangered Species Division at the San Francisco Bay-Delta Fish and Wildlife Office at (916) 930-5603; and the Resident Agent-in-Charge of the Service's Office of Law Enforcement, 5622 Price Way, McClellan, California 95562, at (916) 569-8444.

11.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. The Service recommends that Reclamation, the Corps, and DWR participate in recovery planning and implementation of conservation actions consistent with recovery planning documents.
2. The Service recommends that Reclamation, the Corps, and DWR develop procedures that minimize the effects of all other in-water activities that it conducts within the action area on delta smelt.
3. The Service recommends Reclamation and the Corps work with willing partners to establish and maintain a diverse population of delta smelt for refuge and research purposes, managed to ensure adequate genetic diversity.
4. We recommend that the Reclamation conduct protocol-level surveys for federally-listed species when suitable habitat is present within or may be affected by any proposed actions in the future.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

12.0 REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the CWF. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any additional take will not be exempt from the prohibitions of section 9 of the Act, pending reinitiation.

If you have questions concerning this BiOp, please contact Kaylee Allen, Field Supervisor of the San Francisco Bay-Delta Fish and Wildlife Office, at the letterhead address or at (916) 930-5603.

13.0 LITERATURE CITED FOR ALL SECTIONS EXCLUDING SECTION 9.0

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Bogdan, Kenneth (DWR). June 13, 2017. Electronic mail to the Service. Subject: Minor clarification regarding PA for the California WaterFix.

White, Brooke (Reclamation). January 19, 2017. Electronic mail to the Service. Subject: CWF Proposed Action Operational Commitments Language. With attachment.

Appendix A. Species and critical habitat not likely to be adversely affected.

Reclamation has determined that the following species and critical habitat may be affected, but are not likely to be adversely affected by the PA. We concur with their determinations, and provide our rationale below.

Suisun Species (Suisun Thistle and its Critical Habitat, Soft Bird's-beak and its Critical Habitat, Salt Marsh Harvest Mouse, California Clapper Rail)

The Service concurs that the PA is not likely to adversely affect the salt marsh harvest mouse and California clapper rail because changes in the operation of the salinity control gates in Suisun Marsh would have negligible effects. Therefore, no substantial changes in the extent or quality of habitat or in the risk of toxicological effects from exposure to contaminants are expected.

The Service concurs that the PA is not likely to adversely affect the soft bird's-beak and its critical habitat or Suisun thistle and its critical habitat, because changes in the operation of the salinity control gates in Suisun Marsh would have negligible effects. Therefore, no substantial changes in the extent or quality of habitat and critical habitat for these two species are expected.

California Least Tern

The Service concurs with Reclamation's determination that the PA may affect, but is not likely to adversely affect the California least tern. The PA will result in permanent loss of 269 acres of open water in and around the CCF that constitutes modeled California least tern foraging habitat. However, the modeled foraging habitat in and around the CCF is considered fringe habitat and rarely used by the California least tern as it is rarely seen in the Delta. The primary foraging and nesting habitat near the PA occurs in the regions of the San Francisco Bay, San Pablo Bay, Suisun Bay, Honker Bay and the Confluence of the Sacramento and San Joaquin rivers. The proposed construction activities are located at least 20 miles from the nearest known or recently active California least tern nesting locations and typically, foraging habitat for California least tern is located within 2 miles of their colonies (Atwood and Minsky 1983). On the rare occasion that California least tern attempt to utilize the CCF or other aquatic areas near construction it would likely be able to avoid these areas and utilize foraging habitat elsewhere without detrimental disturbance of their normal foraging, sheltering or reproductive behaviors.

Riparian Brush Rabbit

The Service concurs with Reclamation's determination that the PA may affect, but is not likely to adversely affect the riparian brush rabbit. The riparian brush rabbit is currently only found at the southern end of the Delta. The closest portion of the PA that may affect riparian brush rabbit is the construction of the HORG. The nearest known occupied habitat is located at the oxbow preserve which is approximately 1.1 miles southeast from the HORG. The Oxbow Preserve is almost completely isolated and surrounded by a residential unit to the east and the San Joaquin River to the west. The proposed construction site for the HORG is on the other side of the San Joaquin River from the Oxbow Preserve and is composed of a set of highly modified and

frequently used levees surrounded by active agriculture. There is also currently active construction of multiple residential housing units as part of a large planned community project on the eastern end of Stewart Tract which would further prevent riparian brush rabbit from migrating into the project area. Although riparian brush rabbit can use levee riparian areas for foraging and shelter, the Service conducted site visits of the proposed construction site and determined there was no suitable riparian habitat on the levees nearby that would provide sufficient cover or other basic habitat requirements for the survival of riparian brush rabbit. There is no suitable riparian brush rabbit habitat within or near other portions of the construction footprint for the water conveyance facilities; therefore, other activities associated with the water conveyance facilities are not likely to adversely affect this species.

California Tiger Salamander Critical Habitat

The Service concurs with Reclamation's determination that PA may affect but is not likely to adversely affect California tiger salamander's designated critical habitat. The Service's concurrence is based on the species' designated critical habitat not occurring within the action area for the PA.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Critical Habitat

Critical habitat for the vernal pool tadpole shrimp occurs in the PA at the northern edge of Suisun Marsh. Critical habitat for vernal pool fairy shrimp occurs just west of CCF, and also at the northern edge of Suisun Marsh.

A portion of the PA is within vernal pool fairy shrimp critical habitat unit 19B. Unit 19 A-C encompasses a total of 7,892 acres. Although there is designated critical habitat for the vernal pool fairy shrimp within the action area of the PA, the activities associated with the PA will not affect the primary constituent elements (PCEs) of the critical habitat unit. The described impacts by the PA to designated vernal pool fairy shrimp critical habitat will occur outside of areas that include PCEs and include areas that don't appear to have a direct supporting role in vernal pool fairy shrimp populations within unit 19B.

Critical habitat for the vernal pool tadpole shrimp occurs in the PA at the northern edge of Suisun Marsh, but the PA, as described, is not likely to adversely affect vernal pool tadpole shrimp critical habitat.

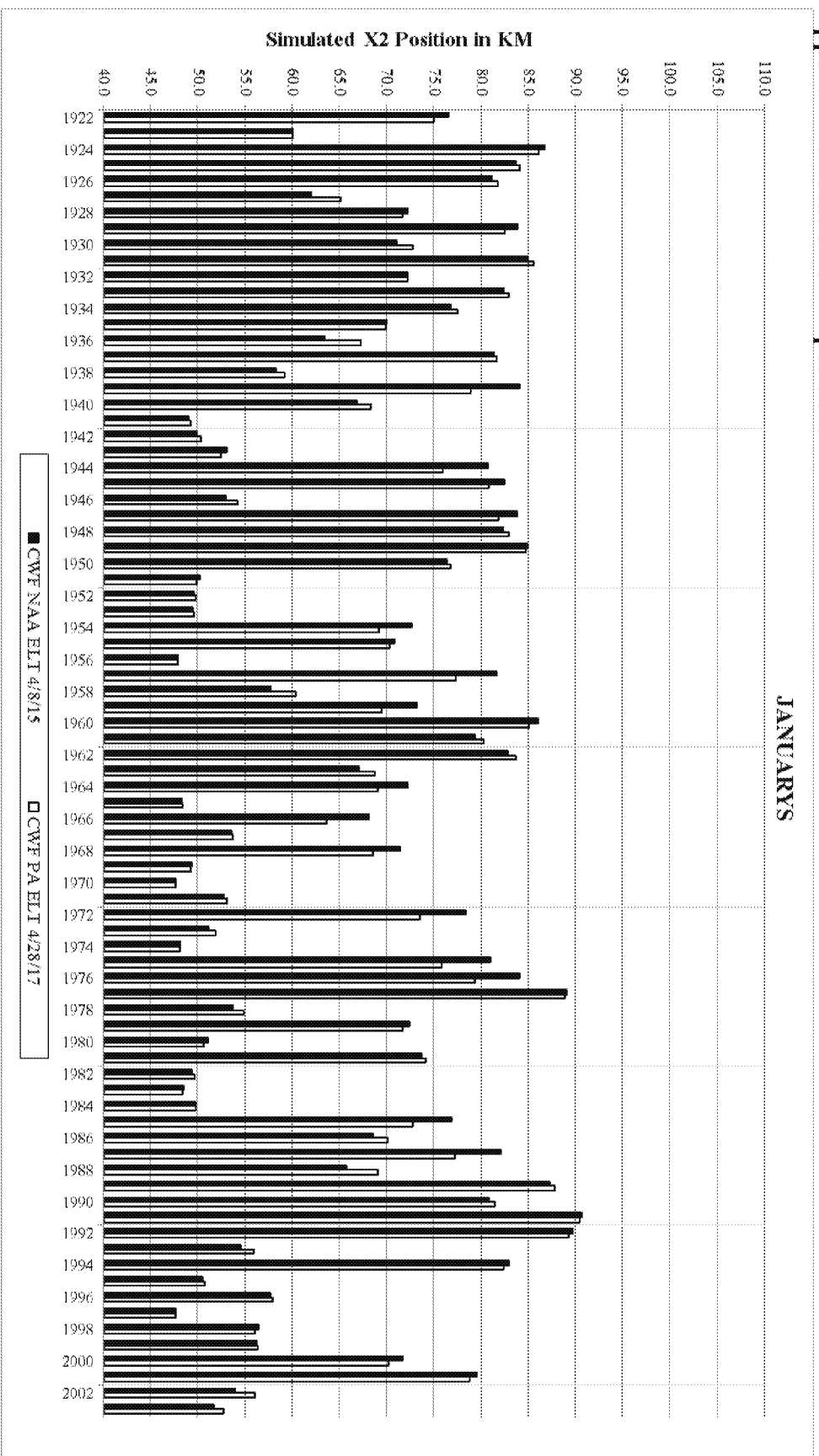


Figure B-1. 82 years of simulated X2 position in kilometers for all Januarys based on 82 years of CalSim II modeling.

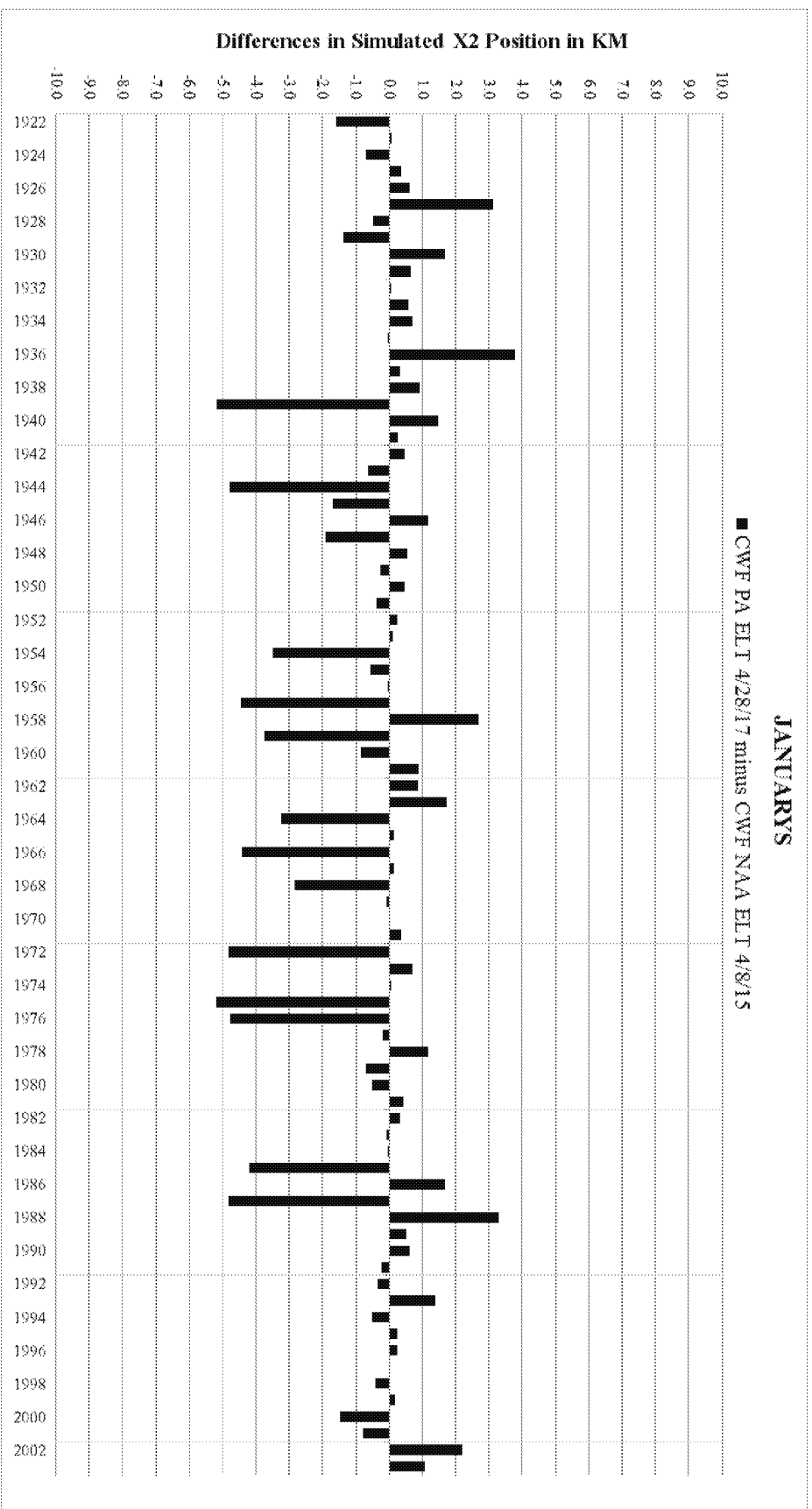


Figure B-2. Difference in the position of X2 in kilometer between the PA and the current projected baseline conditions (NAA) for all Januaries based on 82 years of CalSim II modeling.

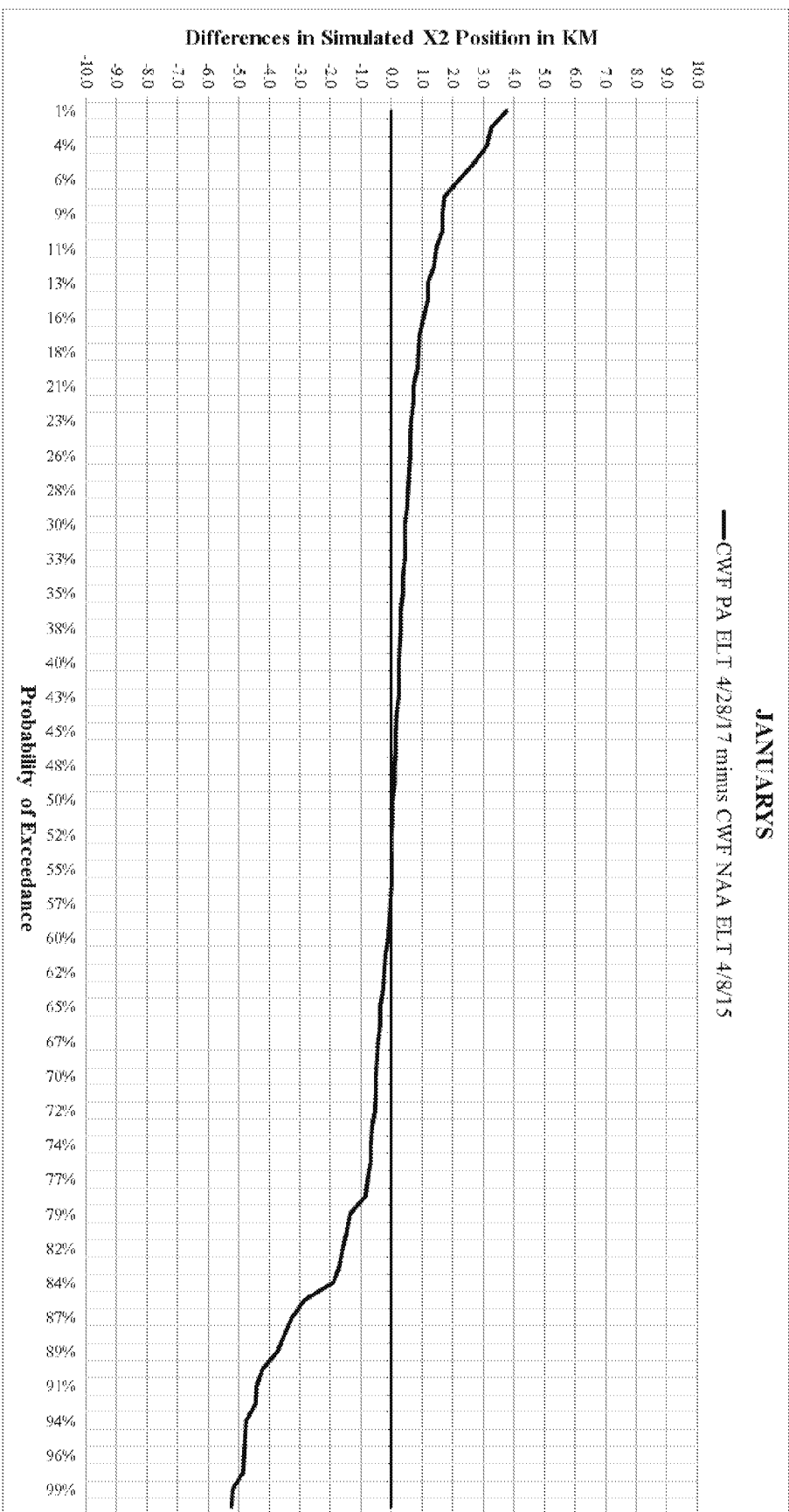


Figure B-4. Probability of exceedances of differences in simulated X2 position for all Januarys based on 82 years of CalSim II modeling.

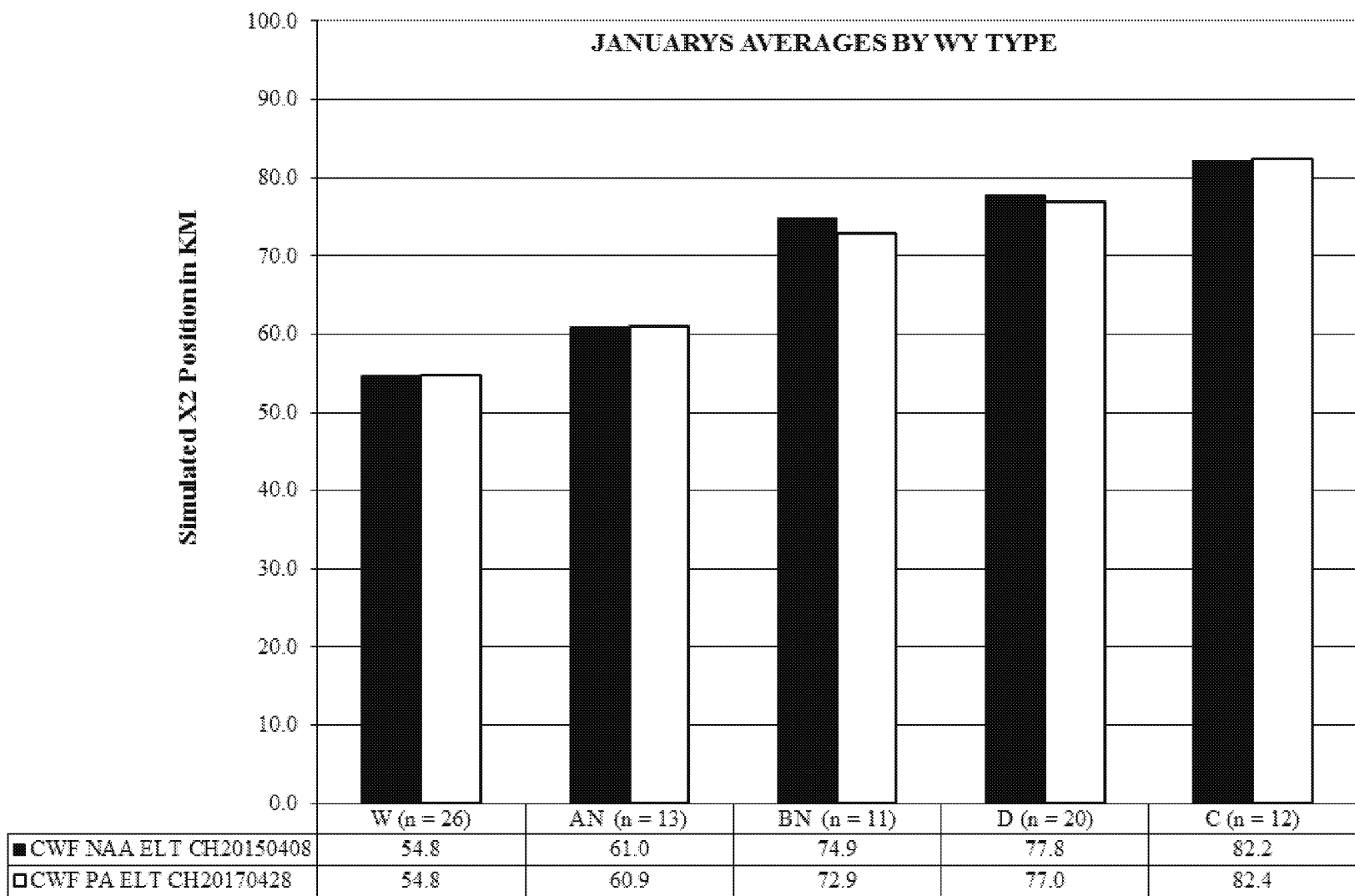


Figure B-3. Simulated X2 position averaged by WY type for all Januarys based on 82 years of CalSim II modeling.

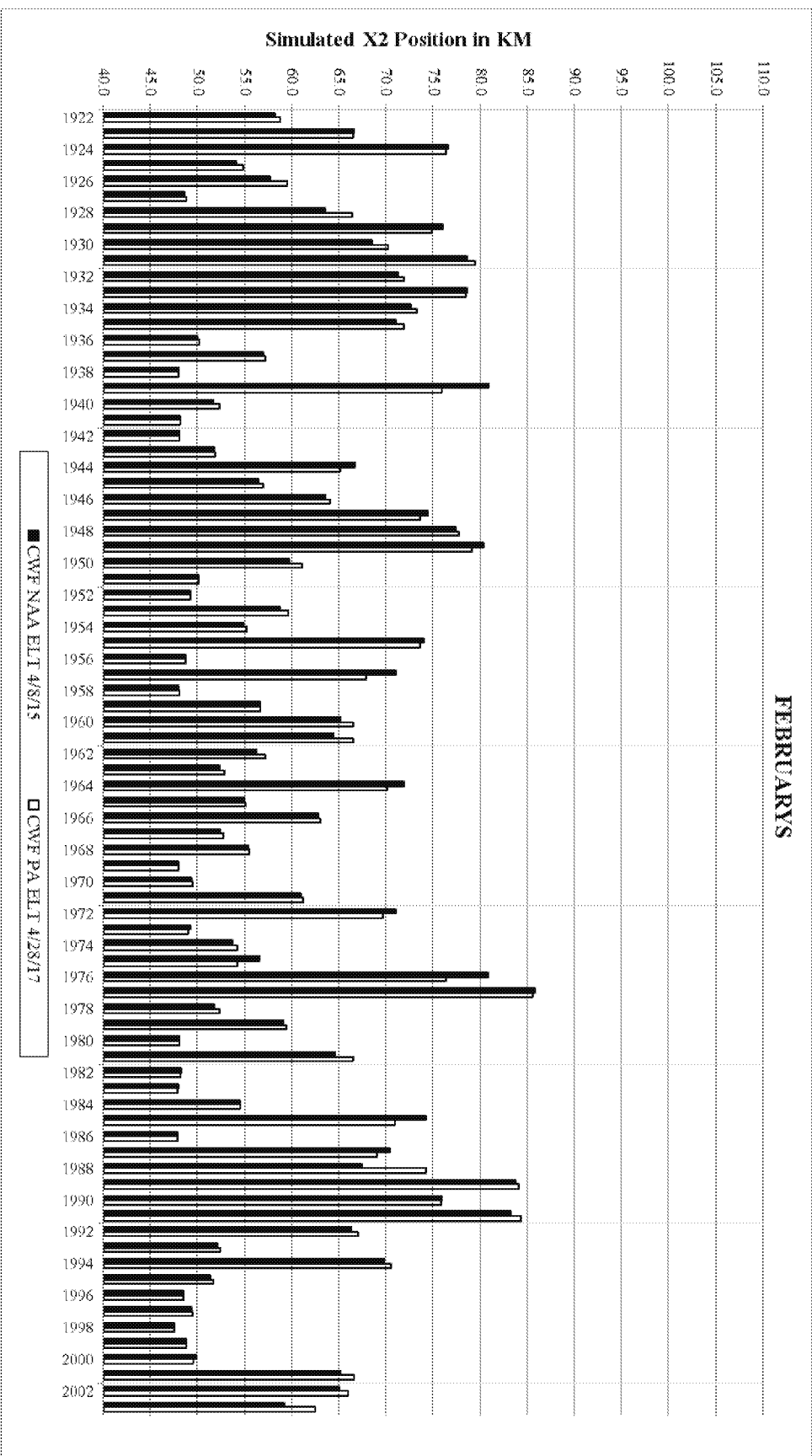


Figure B-5. 82 years of simulated X2 position in kilometers for all Februarys based on 82 years of CalSim II modeling.

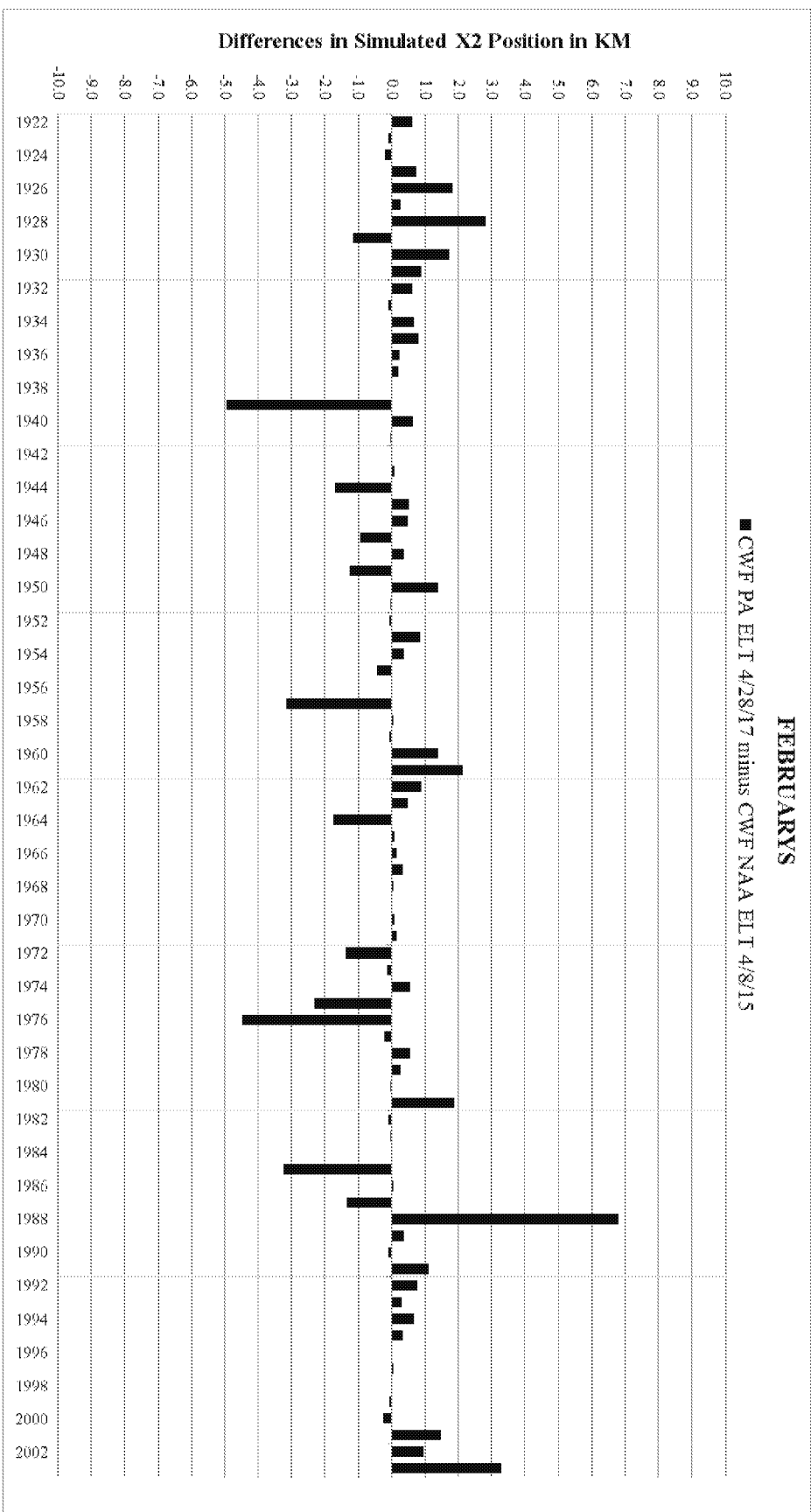


Figure B-6. Difference in the position of X2 in kilometer between the PA and the current projected baseline conditions (NAA) for all Februarys based on 82 years of CalSim II modeling.

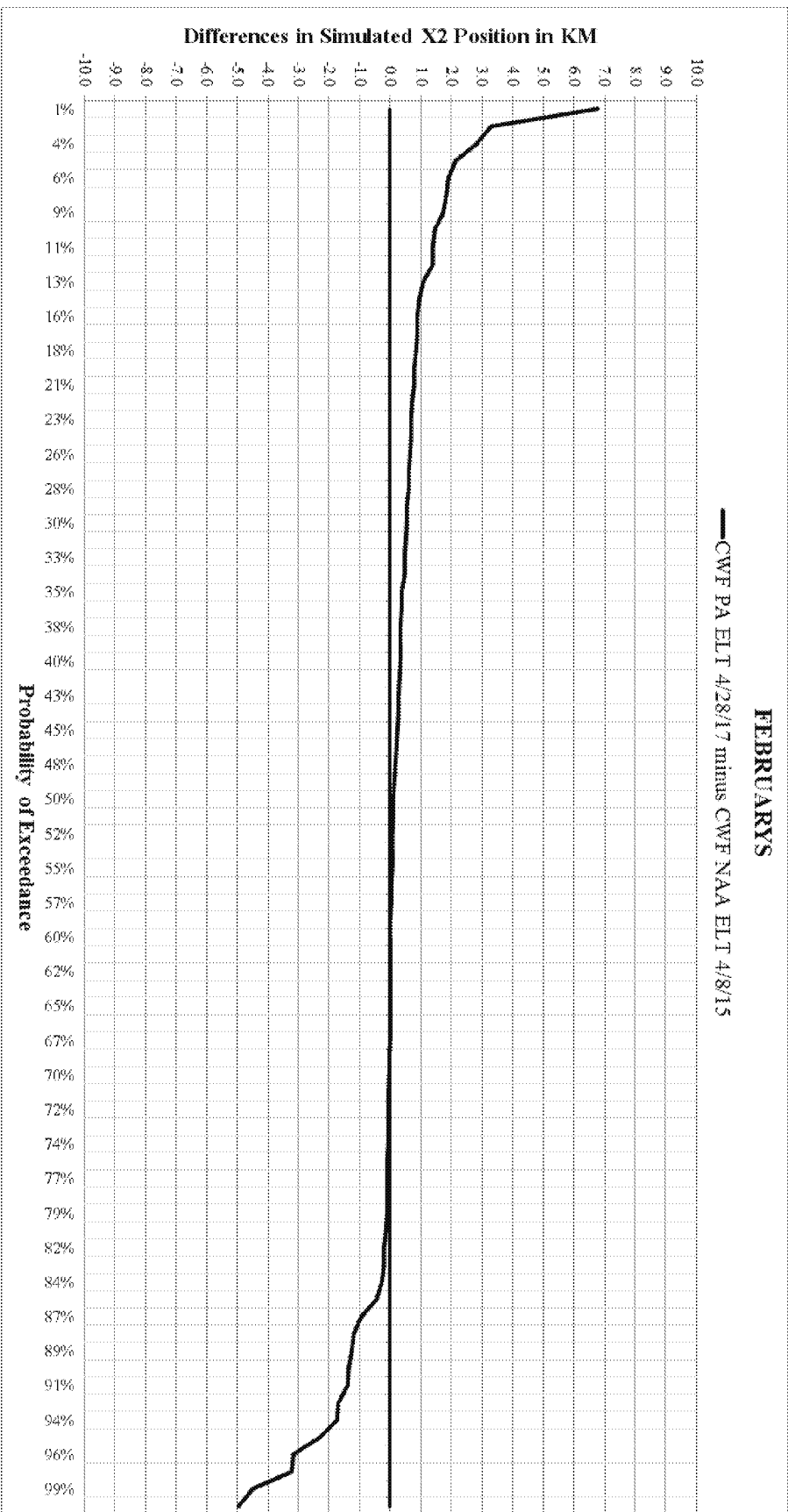


Figure B-7. Probability of exceedances of differences in simulated X2 position for all Februarys based on 82 years of CalSim II modeling.

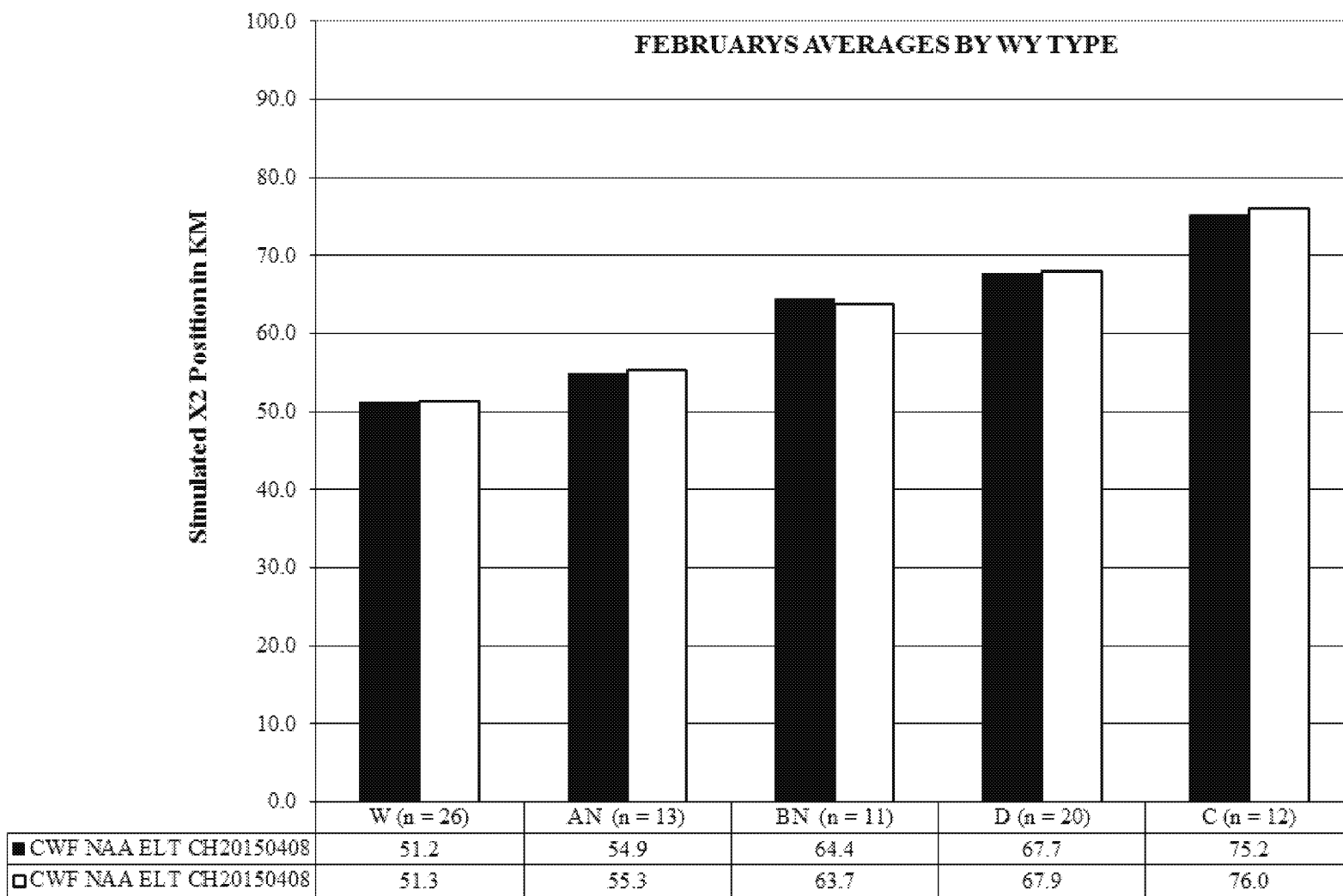


Figure B-8. Simulated X2 position averaged by WY type for all Februarys based on 82 years of CalSim II modeling.

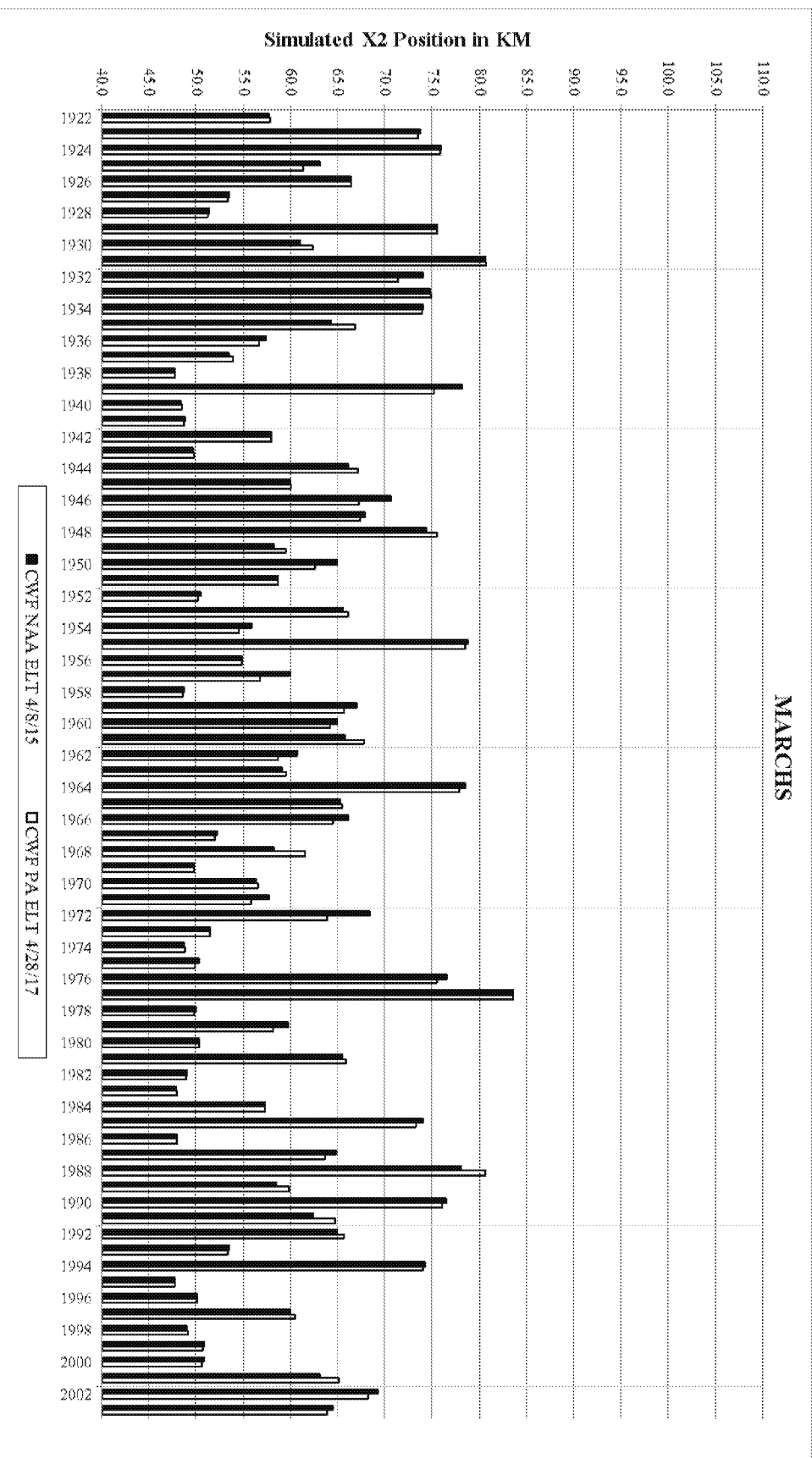


Figure B-9. 82 years of simulated X2 position in kilometers for all Marchs based on 82 years of CalSim II modeling.

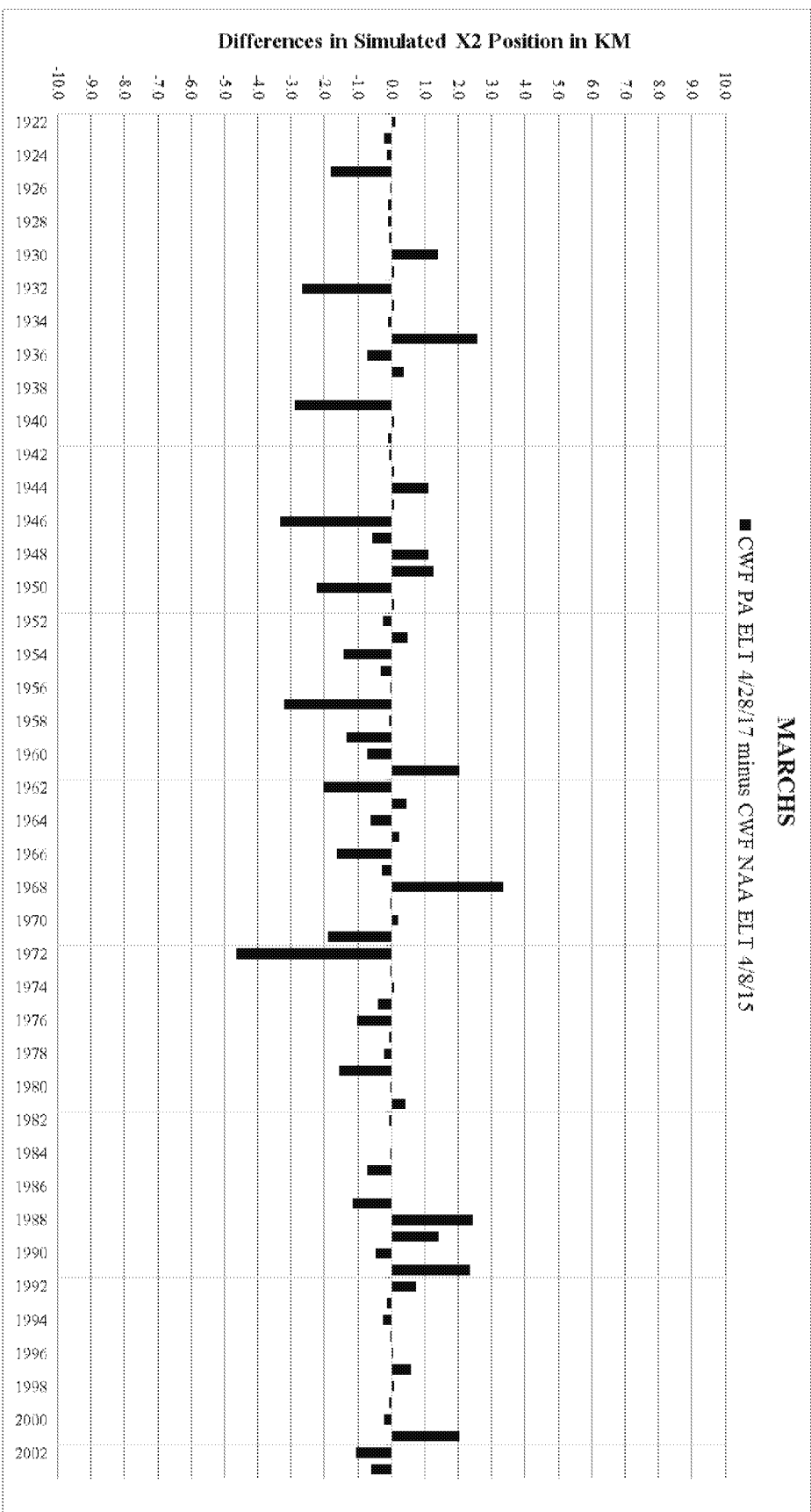


Figure B-10. Difference in the position of X2 in kilometer between the PA and the current projected baseline conditions (NAA) for all Marches based on 82 years of CalSim II modeling.

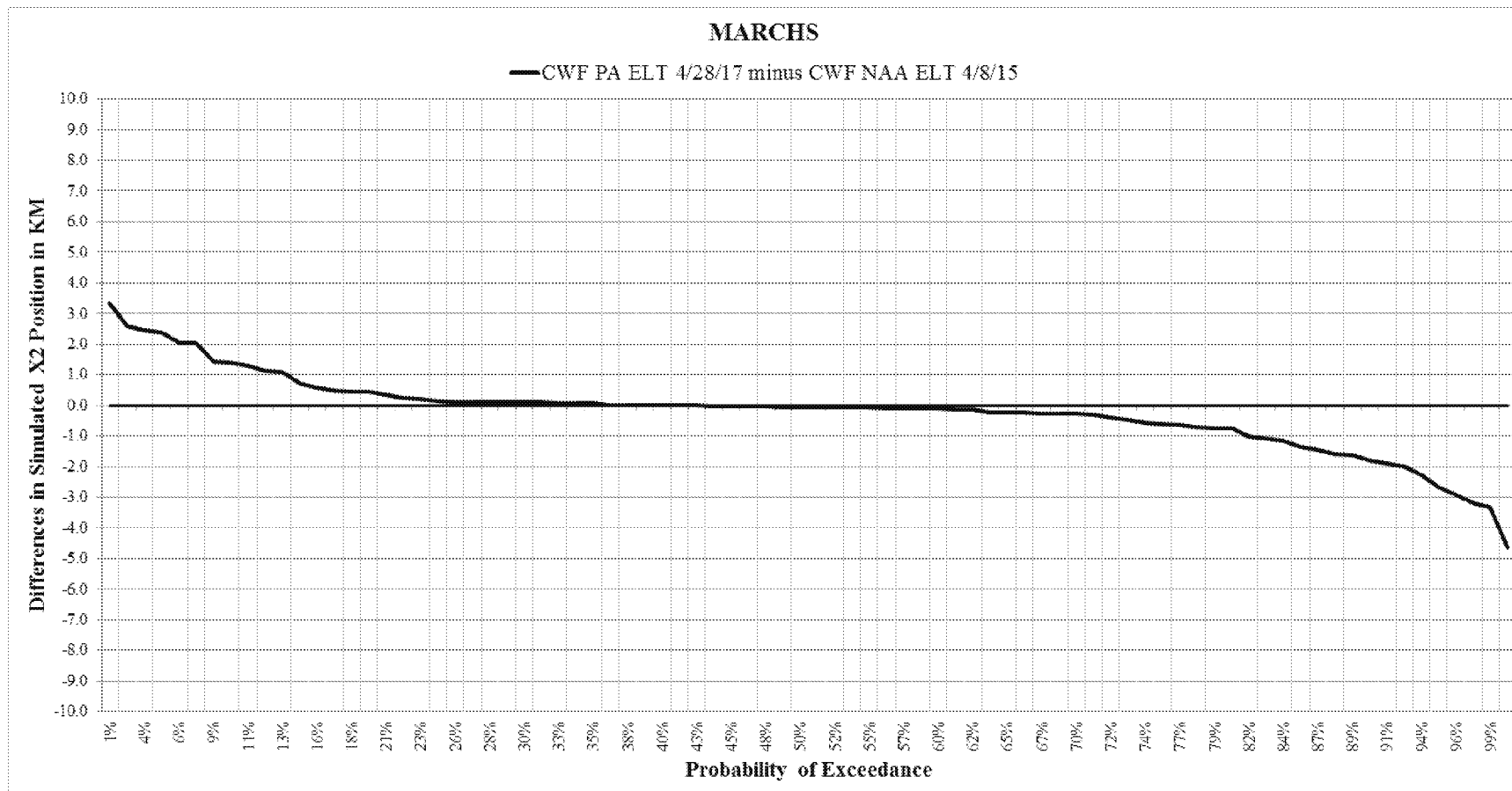


Figure B-11. Probability of exceedances of differences in simulated X2 position for all Marchs based on 82 years of CalSim II modeling.